

# Mount Diablo Astronomical Society

## Diablo Moon Watch

July 2012

### GENERAL MEETING

Tuesday July 24, 2012

## The Sun-Earth Connection

By Dr. Maria D. Kazachenko

Doors open at 6:45 p.m.  
Concord Police Association Facility  
5060 Avila Road, Concord



*The Sun and the Earth are intimately linked. Discover what scientists have learned about how changes on the Sun trigger events on Earth using new space telescopes and how this impacts human exploration of space.*

Dr Maria D. Kazachenko received an M.S. in Mathematics at St-Peterseburg State University Russia. In 2010 she received a Ph.D in Physics at Montana State

University in Bozeman Montana, and is presently doing research at the Space Sciences Laboratory of the University of California-Berkeley. Her research interests include:

- Sigmoids as Precursors of Coronal Mass Ejections
- Topology of Magnetic Fields in Solar Corona; Velocity Tracking;
- The Sun-Earth Connection: Flares vs. Magnetic clouds

## My Tribute to Carl Sagan

by Nathaniel Bates

*Think back on Carl Sagan, those who remember his unique style of scientific presentation, and you think back on a time of scientific innocence.*

During his time, science presented the answer to world problems, provided that we could overcome Cold War rivalries and join together as one planet. No one seemed to represent this sense of optimism more than Carl Sagan. I remember my time watching Sagan's "Cosmos" as a period of awakening for my own

interest in science. I could travel the galaxy with Carl Sagan as my own personal guide. All he had to do was wield his hand and the bottom of the space ship opened up to a starry ocean bottom like a vast coral reef extending for light years.

Carl Sagan did not only travel the galaxy. He also brought us through the pathways of scientific history. The lives of the ancient Greek philosophers, medieval "heretics," Renaissance astronomers, and modern physicists were weaved together as a

good narrative weaves all strands together in to a complete story. The historical aspect was a bit  
(Continued page 5)

### WHAT'S UP

#### Why Aren't There Green Stars?"

*I've had a fascination for the colors of the visible spectrum since early childhood. While taking an elective astronomy class in college, I innocently asked my professor 'Why aren't there green stars?' I didn't like the answer I got.*  
By Kent Richardson

# PRESIDENT'S CORNER

## The Ancestor of the 20th Century Observatory

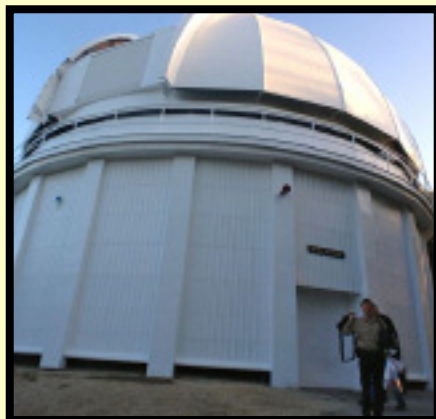
by Chris Ford

*In late May, I was fortunate enough to spend a night observing through the historic 60" reflector on Mount Wilson.*

This instrument can be properly regarded as the ancestor of all modern professional observatory telescopes and will always be associated with George Ellery Hale who raised the funds to build it and George W Ritchey who developed the optics. The 60" is described in most historical works on the development of the astronomical telescope, notably the classic "The History of the Telescope" by Henry C King and also in various sources online, and I will refer you to these for more information on its history and importance. Built in the first decade of the 20th century, its first light was inaugurated in 1908 and it remained the largest telescope in the world until the completion of the adjacent 100" Hooker telescope in 1918.

This famous old reflector which has been one of the most scientifically productive instruments in astronomical history, has recently been decommissioned and is now the largest telescope in the world available to the public for half or full night viewing sessions. In this month's Presidents Corner, I will describe my experience of using this telescope and

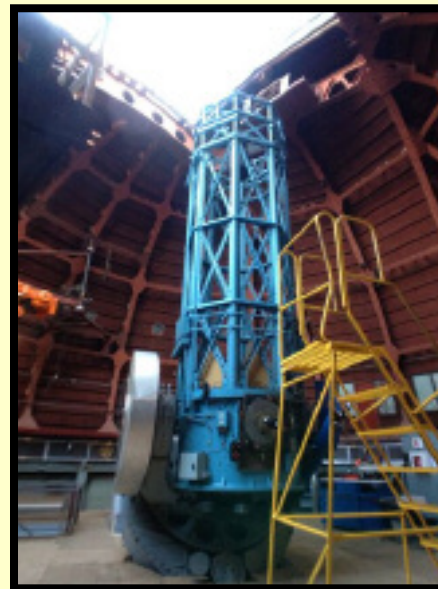
what it is like to observe through 60" of aperture.



*The 60" observatory and dome looking like it was only built yesterday.*

Arriving at Mount Wilson, the 60" observatory had just been painted and looked like it was only a few years rather than over a century old. In fact both inside and out, there appeared remarkably little wear and the telescope and supporting infrastructure was in excellent condition given its age. Only the exposed (and rather dangerous looking) early 20th century electrics gave away the fact that this is now an old building. Up close and personal the telescope definitely is a product of the heavy industrial age, being all steel beams, rivets, and forgings, and generally built like a battleship. In fact the telescope looked like it was erected in a shipyard as essentially it used the same steel working technology of the time. This is not a delicate modern instrument, this is a telescope meant to last for ever, almost a little brutal in its solidity. Yet for all its weight and presence, the 60" telescope slewed smoothly and with little noise. It was fascinating

to see the tools underneath used to correct the fine alignment of this telescope, enormous steel wrenches and levers. Nothing delicate here!



*Inside the 60" dome with the distinctly retro 60".*

*Optically the 60" is a F/16 bent cassegrain in which the eyepiece is located not in the usual place along the central axis requiring a hole in the primary mirror, but instead a tertiary mirror diverts the light cone out of the side of the telescope into an eyepiece just above the main mirror.*

When previously used as a research instrument, the light would often be directed through a coude focus to a spectrometer one level below but this is now unused. The focal length of the telescope is 960 inches and there is an alternate upper cage for a newtonian configuration though also now unused. The quality of the



### Making CONTACT with the Ultimate Telescope (Continued from the previous page)

optics is simply superb and though the original mirror is now over a century old and must have been re-coated at least 50 times, the view was as clean and precise as any modern telescope I have ever looked through. It instilled in me a real respect for the skills of George Ritchey. Being there was also a reminder of the presence of many great astronomers who had previously worked in this observatory such as Barnard, Pickering, Shapley, Hubble, and others.

On the night, the telescope was pointed by an operator who slewed it to suggested targets. There are only two recent custom made 4" eyepieces available, a 50mm and 100mm, though there is also a 4" to 2" adapter for modern commercial eyepieces. Given the enormous focal length of the main telescope, long focal length eyepieces are necessary, but my 48mm Brandon, 31mm Nagler type 5, and even 21mm Ethos worked well. Unfortunately knowing now that I once had a 60" telescope on the other end of these eyepieces makes it hard for my own modest telescopes to compete.



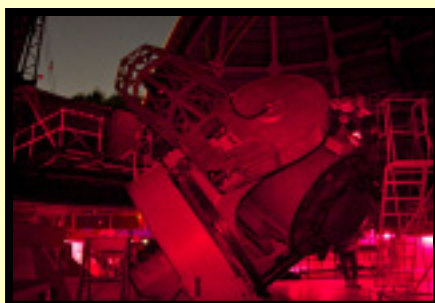
The eyepiece position with a 4" eyepiece inserted.



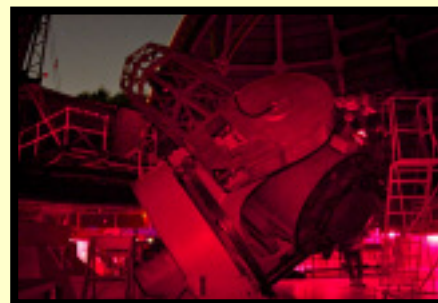
The business end

***Being such an incredibly solid and large instrument, at some viewing positions when pointing nearer the horizon it is necessary to place ones foot on the telescope and even stand on it to maintain balance while viewing.***

When doing so, there is no motion or vibration apparent through the eyepiece at all. In fact I stamped my foot on it while observing and no vibration at all was detectable. I could have probably whacked it with a sledge hammer to no effect. It is that solid. Do not try that on your Dobsonian though!



Red light painted view of the working observatory.



Yes, this telescope needs a ladder!

Being at a 5,712' altitude on a mountain top location near the coast results in exceptionally good seeing, and though the lights of Los Angeles far down on the costal plain have become very bright since the 60" telescope was constructed a century ago, they did not majorly interfere with the objects viewed on the night. I was always aware of the light glow on the sky outside the dome in certain directions however, a strong reminder of why this site is no longer suitable for a lot of research at optical wavelengths. (Though Mount Wilson remains an active observatory)

So what is it like to observe through 60" of aperture in a telescope built like a battleship?

***The long focal length results in high magnification and the aperture delivers high resolution.***

The Moon presented extremely fine detail of mountains and rilles in the Alpine valley and southern mountains, and to convey a sense of the view I used my iPhone afocally to take the image reproduced here.

### Making CONTACT with the Ultimate Telescope (Continued from the previous page)



Afocal image of the Moon taken with my iPhone pressed up against a 4" eyepiece.

***My biggest takeaway however was that 60" opens up a Universe in strong color.***

Color can be perceived in larger amateur telescopes on some objects but is usually diffuse or washed out. At 60" the color is often intense and obvious. The Catseye was a beautiful blue, the double double resembled the headlamps of two trucks head on, the blinking planetary was spectacular at around 1000X through my 21mm Ethos, and Campbell's hydrogen star was simply astonishing with the central star surrounded by a bright red ring. Mars was not a small disk but a defined and colorful three dimensional red planet with evident surface variation. The views of Saturn were remarkable and life time

memories even if the early evening seeing was not perfect. The central star of M57 was almost too easy. On the other hand M27 was very difficult to see, it was just too big for the telescopes field of view and the sky was not dark enough. This is not a telescope for viewing distended and

diffuse nebulae. As visual experiences the above is not easy to relate in writing, but they left an impression in the mind that is hard to forget.

***Overall it was a remarkable experience to observe through this historic instrument which has so many resonances, and it is available to anyone who wishes to book a full or half night by just going to the website link below.***

<http://www.mtwilson.edu/60-inch/60inBrochure.pdf>

It was just as much a privilege to know that this telescope had once been on the end of some of my eyepieces. It has also given me

a severe dose of renewed aperture fever. Unfortunately a 60" telescope on top of my own mountain is a bit out of my price range.

*With many thanks to Bob Minor.*



Fisheye view of the dome interior



### My Tribute to Carl Sagan (Continued from the first page)

simplistic in a way rarely favored by modern historians, but we liked the simplicity and always wanted more. Sagan danced back and forth between the history of astronomical exploration on Earth and the projection of our imaginations in to the cosmos. Matter

may be limited by the speed of light, but Sagan gave us hope that our imaginations were not. We were all made of star stuff, and thus entitled to the stars. We were also entitled to expand our imaginations beyond the limits of the hundreds, thousands or even millions of stars near to us and to encompass

Billions and Billions of Stars.

***My tribute to Carl Sagan is really a tribute to a man who has no successor. No one has really taken his place.***

There are a lot of talented science presenters out there, but we are now in a time of less innocence and more fear. The world has become more of a place of fear since the end of the Cold War. Environmental destruction and terrorism dominate the headlines. While terrorism may have its

roots in religion or politics, environmental destruction clearly has its roots in human technological prowess. No longer can we innocently say that science is a perfect solution to our problems. Few are so naïve as to truly believe that. Science is a tool that can be used



for the peaceful and sustainable purposes Sagan hoped it would be used for, but Sagan's hope that the end of the Cold War would automatically lead to such a use is now less and less manifest. We see more clearly the need for human agency to affect history, as history will not blithely lead us to ever more glory if we simply let it alone.

Sagan's message to an era of exploitation, greed, and destruction is a kind of call-back to innocence. It was curiosity that drove

most of us in to astronomy. Curiosity is the emotion of a child, but one that is not childish. It is the adult and mature emotion of a child. The childlike desire to explore the cosmos is different from those emotions that we outgrow, or that weigh us down. This desire is actually the basis of the adult desire to be more than who one is, to reach for the stars.

***Reach for the stars? Sagan told us that this goal was not possible in one human lifetime.***

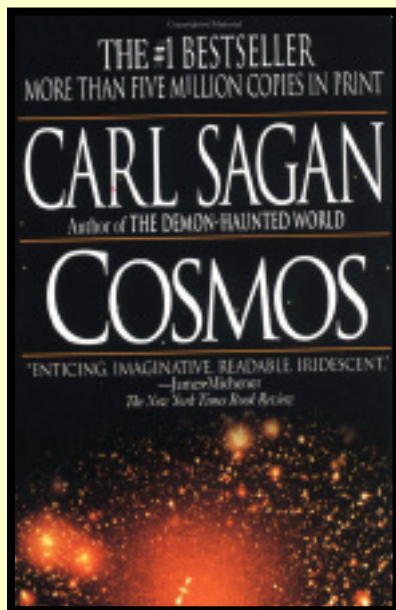
The Universe was too vast. Carl Sagan assumed that this goal was one that would lead to peaceful scientific exploration of the cosmos, in league with advanced aliens who would be with us and not against us. But, this goal was to be in the far, far, distant future. The speed of light is the cosmic speed limit, and we are not jetting to the stars any time soon. That is why Sagan put great hope in radio astronomy. In particular, he was a fan of SETI and the search for extraterrestrial intelligence with methods of radio communication. True to his optimism, he assumed that advanced intelligence would want to communicate with Earthlings. He also assumed that the cosmic speed limit of light would put limits on any ability of aliens to invade us. Those civilizations that survived our phase of war and nuclear energy would be more likely to be peaceful, Sagan assumed, leaving only peaceful civilizations to become advanced. Optimism indeed!

Carl Sagan died not long after

### My Tribute to Carl Sagan (Continued from the previous page)

a meteorite from Mars was announced as having possible bacterial fossils. Soon this claim was disputed, but Sagan died with at least the hope that some form of bacterial fossil was discovered from a world other than Earth. This was Sagan's life dream, the dream of an

Astrobiologist who always returned to the theme of an intelligent cosmos brimming with life. Sagan never made it to "billions and billions of stars," except in his imagination. However, he did make it to the first announcement



of possible life having existed beyond our planet.

President Clinton announced this as a great hope for human kind. After Sagan's death, the bacteria claim was disputed. Soon thereafter, the optimism of the age faded in to a noir tale of terrorism and war, superstitions and the rescinding of the global gains made

at the end of the Cold War. The time of Sagan was over.

***Sagan never saw the coming darkness of night. He died seeing only the night filled with billions and billions of stars.***

I do not blame subsequent science announcers for never quite connecting with the Sagan magic since times have changed so much. When I do look back, however, it is not so much to a more innocent past but to the more innocent future that this past hoped for. "Cosmos" was a fantasy, but one worth reliving. Billions of billions of stars opened up to us, if only in the imagination.

***If we are to make Cosmos a reality, we had better allow our wisdom to catch up to our knowledge. We owe it to Carl Sagan, and to ourselves, to recognize this.***

## Your Help Would Be Greatly Appreciated

Our association needs a few members to come at 6:30 p.m. before our monthly meeting which starts at 7:15 p.m. to help in setting up the chairs and other elements needed to conduct the general meeting.

Similarly at the end of each meeting the chairs and tables have to be removed, the room has to be cleaned and the garbage emptied.

***Thank you for your help.***



## Mount Diablo Astronomical Society Event Calendar–July 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3 	4 Independence Day	5	6	7 Observatory Maintenance (Private)  Sunset: 8:34 PM
8	9 Board Meeting (Private)	10 MDAS Imaging SIG (Private)	11 	12	13	14 Society Observing (Private)  Sunset: 8:32 PM
15	16	17	18 GSSP	19 GSSP 	20 GSSP	21 GSSP 7:30 PM Public Astronomy  Sunset: 8:28 PM
22 GSSP	23 8:00 PM Mars Telecon	24 7:15 PM GenMtg: Solar Science	25	26 	27	28  Sunset: 8:22 PM
29	30	31 Summer Camp (Private)	1	2	3	4



## Beautiful Conjunction over France

Image of Jupiter and our moon, with 2 jovian moons, taken by Philastro from Toulouse, France, July 15 around 4:00 a.m. On the other side of the moon is Aldebaran.

From a french web site dedicated to the astronomy by the name of Webastro with this intriguing and beautiful post.

<http://www.webastro.net/forum/showthread.php?t=94828> --Way down on the page.



### Board Members & Address

#### *President*

Chris Ford - cford81@comcast.net

#### *Vice President*

Rick Linden - Rick.C.Linden@gmail.com

#### *Membership Coordinator, Mtg Room*

Marni Berendsen - berendsen@aol.com

#### *Meeting Program Chair*

Dick Flasck - rflasck@aol.com

#### *Outreach Coordinator, AANC Rep*

Jim Head - jamesnhead@comcast.net

#### *Publicity Board Member*

Steve Jacobs - llasjacobs@astound.net

#### *Observing Committee Chair, Board Member*

Richard Ozer - rozer@pacbell.net

#### *Whats Up Coordinator, Board Member*

Kent Richardson - kayarind@sbcglobal.net

#### *Treasurer*

Will Roberge - wil@donabue.com

#### *Newsletter Editor*

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#### *Webmaster*

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#### *Secretary and Refreshments*

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#### *New Member Steward*

Nick Tsakoyias - claytonjandl@aol.com

#### *Mailing address:*

MDAS

P.O. Box 4889

Walnut Creek, CA 94596-3754

#### *General Meetings:*

Fourth Tuesday every month,  
except on the third Tuesday in  
November and December.  
Refreshments and conversations  
Meetings begin at 7:15pm.

#### *Where:*

Concord Police Association  
5060 Avila Road, Concord, CA 94596-3754

#### *Directions to facility:*

Avila Road is off Willow Pass Road. Turn east  
onto Avila Road approximately 300 yards  
south of the Willow Pass Road off-ramp from  
the Route 4 freeway. Turn right into the Police  
Association Facility at the crest of the first hill.

